

6. On some Points in the Anatomy of *Heloderma*.

By Prof. C. STEWART.

[Received January 20, 1891.]

(Plate XI.)

Having had an opportunity of examining the more or less entire viscera of three specimens of *Heloderma*, viz. a male and female of *H. suspectum*, and one female of *H. horridum*, I have thought that a comparison between them might be of interest, and also that it was desirable to call attention to some features in which my specimens appeared to differ from the recorded observations of others, and to give a brief description of the male urogenital system of *H. suspectum*. Dr. J. G. Fischer, in a paper published in 1878, has given figures and a full account of the poison-apparatus, hyoidean muscles, &c. of *H. horridum*. In the 'Proceedings' of this Society for 1890 is a very complete description of the anatomy of a female specimen of *H. suspectum* by Dr. R. W. Shufeldt.

*Thyroid Gland*.—The thyroid of *H. suspectum* is figured and described by Dr. Shufeldt as a bilobed structure, the lobes united by a transverse isthmus, and situated in front of the trachea at the base of the heart, but in a footnote (*op. cit.* p. 206) he states that he may have mistaken blood-stained tissue for the thyroid, but that he failed to find anything else which resembled that organ. In all my specimens it was readily found, as a paired organ, the lobes placed one on each side of the trachea and totally unconnected by an isthmus. They were surrounded by a well-defined capsule, to which they were attached by trabeculæ, the capsule apparently forming the walls of a lymph-sinus.

In *H. horridum* the lower border of the thyroid is 47 mm. from the base of the heart, and 73 mm. from the laryngeal opening. The right lobe is 9 mm. long, 5 mm. broad, and  $1\frac{1}{2}$  mm. thick. The left lobe is 7 mm. long, with width and thickness the same as the right.

The lower border of the thyroid in the male *H. suspectum* is 46 mm. from the glottis, each lobe was 11 mm. long and  $3\frac{1}{2}$  broad; the extremity of the left lobe nearest the trachea was pointed, and from the corresponding end of the right lobe there was a delicate prolongation extending forwards, in length equal to that of the main body of the lobe. In the female *H. suspectum* the thyroid was similar in shape, but somewhat smaller than in *H. horridum*.

*Trachea, Larynx, and Lungs*.—The length of trachea and larynx from the glottis to bifurcation of bronchi was 110 mm. in *H. horridum*; from bifurcation to point of entrance into lung 13 mm. There were seven large openings from the continuation of the bronchus into the lung-tissue, in front of its posterior termination. They are situated on the ventral surface. Each of the posterior three shows more or less a division into two, a condition more marked in other Lacertilia,

e. g. *Varanus*. The length of the continuation of the bronchus through lung-substance is 55 mm.

The lung is 173 mm. long, the thin-walled rounded posterior end is the larger; anteriorly the lung terminates in a blunt point. Dr. Shufeldt points out that in *Heloderma* the bronchi are long, but that Prof. Mivart states that they are short in *Lacertilia*. May not this discrepancy be due to the latter anatomist having measured from the bifurcation to the point of their entrance into the lungs, whilst Dr. Shufeldt included the prolongation into lung-substance?

*Kidneys*.—If the kidneys of the large female *H. horridum* be compared with those of the somewhat small specimen of male *H. suspectum*, one is struck by the relative small size and more numerous lobulation of those of the former. They also show a marked distinction into an oval anterior region, and a tail-like posterior prolongation formed of from four to six small lobules closely adherent to the ureter. In *H. suspectum* the kidney gradually tapers to the posterior extremity. The length of the fore part of the kidney in *H. horridum* was 35 mm.; its breadth 15 mm.; the tail-region 15 mm. long.

In the large male *H. suspectum* the kidney was 70 mm. long and 16 broad.

*Genitalia*.—The genitalia of the male *H. suspectum* presented the ordinary Lacertilian features. The dorsal wall of the cloaca was provided with a couple of anal glands, whilst a belt of similar though smaller glands surrounded the ventral half of its circumference.

The female *H. suspectum* was much the smaller of the three examples of the genus examined. In it the left ovary contained two nearly ripe ova, the right ovary three; the largest ovum measured 24 mm. by 21 mm.

*Inferior labial Poison-glands*.—The most interesting feature in the anatomy of *Heloderma* is probably the poison-apparatus figured and described by Fischer and Shufeldt. These both agree in stating that from the surface of each "submaxillary gland" nearest the lower jaw proceed from four to five ducts which pass into the substance of the jaw, and finally discharge the secretion of the gland at the bases of certain of the grooved teeth. This view of the structure I hold to be incorrect, and believe that the gland and its ducts are altogether external to the jaw; that the ducts pass directly from the substance of the gland to their openings, which are situated to the inner side of a fold of mucous membrane which intervenes between the lip and the jaw. In *H. horridum* I only found one opening on either side, a guarded bristle could readily be passed through this into the upper of the three chief lobes of the gland; and on injecting the substance of either lobe by means of a hypodermic syringe, the fluid escaped by this orifice alone.

When the gland of *H. suspectum* was similarly treated, the fluid in like manner freely flowed from all the four or five openings on the mucous surface, without a trace passing into the supposed ducts which went to the jaw, these being in my opinion only the branches

of the inferior dental nerve and associated blood-vessels which are normally found in this situation.

The glands have not a smooth surface such as the figures given would indicate, but are divided into well-defined lobules, which in *H. suspectum* converge and partly fuse as they pass upwards and forwards from lower border to the anterior extremity.

Behind the poison-glands are a few small mucous glands.

When dissecting the fresh specimen of *Heloderma* under water, the slightest pressure on the poison-gland caused a milky fluid to escape from the gland-openings referred to above; this fluid readily diffused itself in the water, whereas the mucus from the other glands hung about as more transparent ropy clouds.

#### EXPLANATION OF PLATE XI.

Fig. 1. Dissection of the ventral surface of the head and neck of *H. suspectum*.

- G. Left poison-gland; the right gland has been raised to show the branches of the inferior dental nerve and blood-vessels. T. Left lobe of thyroid gland.
2. Inner surface of left poison-gland of *H. horridum*.
3. Diagrammatic section of lower jaw and poison-gland. J. Jaw; G. Gland; D. Its duct; S. Skin.
4. Left kidney of *H. horridum*.
5. Left urogenital system of *H. suspectum*. K. Kidney; B. Bladder; U. Ureter; T. Testis; V.D. Vas deferens; R. Rectum; R.M. Rectal muscles; C. Cloaca; D.A.G. Dorsal anal gland; P. Penis; C.M.P. Constrictor muscle of penis; R.M.P. Retractor muscle of penis; S. Skin.

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February 3, 1891.

Prof. Flower, C.B., LL.D., F.R.S., President, in the Chair.

The Secretary read the following report on the additions to the Society's Menagerie during the month of January 1891:—

The total number of registered additions to the Society's Menagerie during the month of January was 76, of which 62 were by presentation, 4 by exchange, 4 by purchase, 1 by birth, and 5 were received on deposit. The total number of departures during the same period, by death and removals, was 71.

Amongst the additions special attention may be called to:—

A Yellow-crowned Penguin (*Eudyptes antipodum*), from New Zealand, presented by Sir Henry Peek, Bart., F.Z.S.

This is a scarce species (*cf.* Buller, B. New Zealand, pl. xlvi. p. 294), and we have never received a specimen of it before.

Mr. Larkworthy, who procured this Penguin for Sir Henry Peek, writes as follows concerning its capture:—"There is an Oyster Fishery established at the Bluff Harbour, Southland, N. Z., and the operations of the fishermen are carried out in the straits between the Middle Island and Stewart's Island. This bird and others, six in all, were captured by the crew of one of the oyster-boats, in one of the small bays in Stewart's Island, and sent thence to Port Chalmers, Otago, to wait for a steamer."

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A letter was read from Dr. Emin Pasha, C.M.Z.S., dated Bussisi (on Lake Victoria Nyanza), October 6, 1890, announcing the despatch to the Society of a collection of Birds which he had made on his way up from the coast.

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The Secretary exhibited, on behalf of Mr. J. W. Willis-Bund, F.Z.S., a specimen of the Collared Petrel (*Æstrelata torquata*, Macg.), which had been shot off the Welsh coast in Cardigan Bay in December 1889, as recorded in the 'Zoologist' for 1890 (p. 454).

This was the first instance of the occurrence of this South-Pacific species in the British seas.

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The following papers were read:—

1. On the Question of Saurognathism of the Pici, and other Osteological Notes upon that Group. By R. W. SHUFELDT, C.M.Z.S. &c.

[Received January 9, 1891.]

For a number of years past the doubt has been growing in my mind as to the correctness of the interpretation placed upon the osseous structures at the base of the skull in the *Pici* by three morphologists who are the upholders of the idea of a state of saurognathism in these birds. This doubt has been strengthened during these years by many studies of the anatomy of Woodpeckers in all stages of growth and of many species. Within the past year the osteology of all the United States genera of this group in numerous cases, including skeletons of adults, subadults, and nestlings, has been carefully reviewed by me upon ample material. This last investigation has confirmed my doubts.

Of all those ornithotomists of authority who have made researches in this direction, the opinions of but three shall be adverted to here, and references will be made to Huxley, Parker, and Garrod.

No blame is attached to that host of most capable systematic ornithologists who, never having dissected a Woodpecker in their lives, have in their published works more or less blindly adopted the views of those who have relegated the *Pici* to a saurognathous group created to contain them. As is well-known, among the more recent interpreters of the structures exemplified on the part of birds, Professor Huxley, in his remarkable paper which appeared in the Proceedings of this Society for 1867 on the Classification of Birds, presented the results of some of his studies of the cranial peculiarities seen among the Woodpeckers. And so impressed was he with the apparently unique condition of certain osseous structures seen at the